# TBK. TIEDTKE - BÜHLING - KINNE & PARTNER (GbR)

## VIA FAX & MAIL (fax includes 8 pages in total)

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PCT-Application No.: PCT/IB2002/002181
Applicant: Nokia Corporation
Our ref.: WO 33191                    (Frist: 11.5. Eing.)

In response to the Written Opinion dated March 12, 2004.

Attached is submitted a new set of claims 1 to 19 on which
the further International Preliminary Examination
Proceedings is to be based.

New method claim 1 has been formed by combining original
claims 1, 2. New independent system claim 10 is based on
original claims 11, 12. New network entity claim 19 is
based on original claim 21 and has been amended by adding
the features of original dependent claim 12.

Attached dependent claims 2 to 9, and 11 to 18 are based on
original claims 3 to 10, and 13 to 20.

According to the independent claims, a method, system and
network element for adaptive setting or reservation of
channelization codes and/or power for downlink channel is
provided wherein three kinds of measurements are carried
out, namely averaged transmitted power of a PDSCH, relative
activity factor of the PDSCH, and weighted code blocking

rate. The root spreading factor and power are adaptively adjusted based on these three kinds of measurements.

Reference D1, EP-A-1 209 936, has been cited mainly with respect to the original independent claims. No patentability objections were raised against the subject-matter of original dependent claim 2 (now included into all independent claims).

Further, the International Search Report likewise lists this reference D1 only with regard to the original independent claims as relevant. As to original claims 2, 12, this reference is correctly classified as representing only general state of the art which is not considered to be of particular relevance.

The claimed subject-matter thus contains novel matter which is based on inventive step.

It is respectfully requested to issue an IPER confirming patentability of the subject-matter of the attached claims.

In case of any further objections, issuance of a second Written Opinion is requested.

Ronald Roth
Patentanwalt
**TBK-Patent**

Enclosure (via fax & mail):
New set of claims 1 to 19

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## CLAIMS

10      1. A method for adaptive setting or reservation of channelization codes and/or power for downlink channel in a communication network, using parameters ($SF_{min}$, $P_{txDSCHallowed}$) for minimum allowed Spreading Factor, SF, and/or allowed power level, the parameters being set depending on the

15 traffic load, the total cell load and/or the availability of channelization codes, wherein three kinds of measurements are performed:

1. Average transmitted power of a physical shared downlink channel, PDSCH,

20      2. Relative activity factor, A, of the PDSCH, and

3. Weighted code blocking rate, B,

and adaptive adjustment of root spreading factor and power is based on these three kinds of measurements.

25      2. The method of claim 1, wherein a criteria for adjustment of the allowed power level is:

if $A$ is smaller than $TH_{A1}$, and $P_{txDSCHest}$ is smaller than .($P_{txPDSCHallowed} - X$), then decrease the reserved power, preferably by X or a fraction thereof,

30 $A$ representing *an* activity factor of the downlink channel, $TH_{A1}$ a threshold parameter, $P_{txDSCHest}$ the estimated power of the downlink channel, $P_{txPDSCHallowed}$ the power allowed for the downlink channel, and $X$ a certain set value.

3. The method of claim 1, or 2, wherein a criteria for adjustment of the allowed power level is:

if $A$ is greater than $TH_{A2}$, and $P_{txDSCHest}$ is greater than $(P_{txPDSCHallowed} - X)$, then increase the allowed power by $X$, $A$ representing an activity factor of the downlink channel, $TH_{A2}$ a threshold parameter, $P_{txDSCHest}$ the estimated power of the downlink channel, $P_{txPDSCHallowed}$ the power allowed for the downlink channel, and $X$ a certain set value.

4. The method of any one of the preceding claims, wherein a criteria for adjustment of the minimum spreading factor, $SF_{min}$ , is:

if $B$ is greater than $TH_B$, and $A$ is greater than $TH_{A2}$, then decrease $SF_{min}$ (allow higher bit rates), $B$ representing a weighted code-blocking rate, $A$ an activity factor of the downlink channel, and $TH_B$ and $TH_{A2}$ threshold values.

5. The method of any one of the preceding claims, wherein a criteria for adjustment of the minimum spreading factor, $SF_{min}$ , is:

if $B = 0$ (zero), and $L_{code}$ is greater than $TH_{code}$, then increase $SF_{min}$ (maximum bit rate is decreased), $B$ representing a weighted code-blocking rate, $L_{code}$ a current load of a code tree, and $TH_{code}$ a threshold parameter.

6. The method of any one of the preceding claims, wherein a method for channelization code allocation comprises a step of reserving a new root code with a given spreading factor (Spreading Factor), and a subsequent step of deciding where in a code tree this reservation is to be made.

7. The method of claim 6, wherein codes for downlink

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basically are assigned in the code tree starting from a
certain limb of the code tree, and codes are assigned for
users primarily in another limb of the code tree.

5          8. The method of claim 6 or 7, wherein a default
capacity is allocated to a territory, e.g. DSCH territory to
be used by HS-DSCH and DSCH, when the total code tree load
allows this, wherein spreading factor SF is only increased if
the code tree is highly loaded.

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          9. The method of any one of the preceding claims,
wherein total cell load is measured by power.

          10. A system for adaptive setting or reservation of
15  channelization codes and/or power for downlink channel in a
communication network, using parameters ($P_{txDSCHallowed}$, $SF_{min}$)
for minimum allowed Spreading Factor, SF, and/or allowed
power level, the parameters being set depending on the
traffic load, the total cell load and/or the availability of
20  channelization codes,
          wherein the system is adapted to perform three kinds
of measurements:
          1. Average transmitted power of a physical shared
downlink channel, PDSCH,
25          2. Relative activity factor, A, of the PDSCH, and
          3. Weighted code blocking rate, B,
and to base adaptive adjustment of root spreading factor and
power on these three kinds of measurements.

30          11. The system of claim 10, wherein a criteria for
adjustment of the allowed power level is:
          if $A$ is smaller than $TH_{A1}$, and $P_{txDSCHest}$ is smaller
than ($P_{txPDSCHallowed}$ – X), then decrease the reserved power,

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preferably by X or a fraction thereof,

A *representing an* activity factor of the downlink channel, $TH_{A1}$ a threshold parameter, $P_{txDSCHest}$ the estimated power of the downlink channel, $P_{txPDSCHallowed}$ the power allowed for the downlink channel, and X a certain set value.


12. The system of claim 10, wherein a criteria for adjustment of the allowed power level is:

if A is greater than $TH_{A2}$, and $P_{txDSCHest}$ is greater than $(P_{txPDSCHallowed} - X)$, then increase the allowed power by X,

A representing an activity factor of the downlink channel, $TH_{A2}$ a threshold parameter, $P_{txDSCHest}$ the estimated power of the downlink channel, $P_{txPDSCHallowed}$ the power allowed for the downlink channel, and X a certain set value.


13. The system of any one of the preceding system claims, wherein a criteria for adjustment of the minimum spreading factor, $SF_{min}$ , is:

if B is greater than $TH_B$, and A is greater than $TH_{A2}$, then decrease $SF_{min}$ (allow higher bit rates),

B representing a weighted code-blocking rate, A an activity factor of the downlink channel, and $TH_B$ and $TH_{A2}$ threshold values.


14. The system of any one of the preceding system claims, wherein a criteria for adjustment of the minimum spreading factor, $SF_{min}$ , is:

if B = 0 (zero), and $L_{code}$ is greater than $TH_{code}$, then increase $SF_{min}$ (maximum bit rate is decreased),

B representing a weighted code-blocking rate, $L_{code}$ a current load of a code tree, and $TH_{code}$ a threshold parameter.


15. The system of any one of the preceding system

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claims, wherein a method for channelization code allocation comprises a step of reserving a new root code with a given spreading factor SF, and a subsequent step of deciding where in a code tree this reservation is to be made.

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16. The system of claim 15, wherein codes for downlink basically are assigned in the code tree starting from a certain limb of the code tree, and codes are assigned for users primarily in another limb of the code tree.

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17. The system of claim 15 or 16, wherein a default capacity is allocated to a territory, e.g. DSCH territory to be used by HS-DSCH and DSCH, when the total code tree load allows this, wherein spreading factor SF is only increased if
15    the code tree is highly loaded.

18. The system of any one of the preceding system claims, being adapted to measure the total cell load by measuring power.

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19. A network entity, preferably to be used in a method as defined in any one of the preceding method claims, or in a system as defined in any one of the preceding system claims, for adaptive setting or reservation of channelization
25    codes and/or power for downlink channel in a communication network, in particular for downlink shared channel, DSCH, and high speed downlink shared channel, HS-DSCH, using parameters ($P_{txDSCHallowed}$, $SF_{min}$) for minimum allowed Spreading Factor, SF, and/or allowed power level, the parameters being set
30    depending on the traffic load, the total cell load and/or the availability of channelization codes,

wherein the entity is adapted to perform three kinds of measurements:

1. Average transmitted power of a physical shared downlink channel, PDSCH,

2. Relative activity factor, A, of the PDSCH, and

3. Weighted code blocking rate, B,

5 and to base adaptive adjustment of root spreading factor and power on these three kinds of measurements.